

CITY OF ROCKVILLE, MARYLAND MASTER PLAN CHAPTER FOUR

TRANSPORTATION

GOAL: *Provide a multimodal transportation system that enhances mobility while protecting neighborhoods and the environment.*

INTRODUCTION

This chapter provides an overview of transportation issues in Rockville by identifying existing conditions, analyzing future forecast transportation demand, and offering strategies to meet the challenges that the City will face over the next twenty years. The intent of the chapter is to outline citywide objectives, provide direction through recommendations, and offer a framework for evaluation of progress made in meeting these objectives.

The influences of land use, historically significant areas, and the environment must be taken into account in developing a comprehensive transportation system for the City of Rockville. The system must work efficiently to serve all residents, employment centers, parks, and schools. It is evident that the conclusions and challenges outlined in the other sections of this Master Plan closely interrelate with transportation issues. For example, decisions on community appearance and design will dictate the accessibility of a neighborhood to the various modes of transportation, especially pedestrian and bike circulation.

This chapter focuses on multi-modal transportation planning. In transportation a mode refers to one particular means of transportation, such as the private automobile, public bus, Metrorail system, bicycle, or walking. Multi-modal refers to a system in which various modes of transportation are competitive, the use of multiple modes is encouraged, and transfers between modes are facilitated.

CURRENT CONDITIONS

Description of Existing Roadway Network

The city's road network is essentially complete, and there is little room for expansion of the roadway system. The challenge for Rockville is to maintain and improve the efficiency of the existing system, complete the remaining capacity improvements, and ensure that new development does not overwhelm the road network.

Due to its location within the Washington Metropolitan region, Rockville faces a unique set of transportation issues. Many of the city's roads are essential links for regional traffic movement. Rockville has four interchanges with I-270, which connects to the Capital Beltway (I-495) to the south and I-70 in Frederick to the north. Maryland Route 355 is a major north-south road and Rockville Pike is one of the premier shopping areas in the metropolitan region. Maryland Route 28 and Maryland Route 586 are major east-west routes.

The State and Montgomery County regard these major streets from the standpoint of regional traffic management and efficiency. The City must balance this perspective with local concerns, such as neighborhood access and protection, bicycle and pedestrian movements, and urban design. This is of particular importance in Town Center where several state routes pass through an area of high pedestrian activity.

Because the goals and priorities vary considerably for different types of streets, Rockville classifies city roads based on the function of the road and on the nature of the area through which the road runs. The classes are a hybrid form of the street classes typically used by traffic professionals. The following table summarizes the eight classes and two subclasses of streets. Street classifications recommended in the Master Plan are intended to serve as a guideline for future decision-making. Actual classification is determined by procedures outlined in *Chapter 21* of the City Code.

Though Rockville has two major north-south corridors, east-west connections between them and to other parts of the city are lacking. The Metrorail and AMTRAK tracks also complicate east-west circulation leading to bottlenecks at the few crossing points.

Congestion is another major problem in Rockville. The following map shows current traffic volumes on corridors. These volumes come from actual traffic counts.

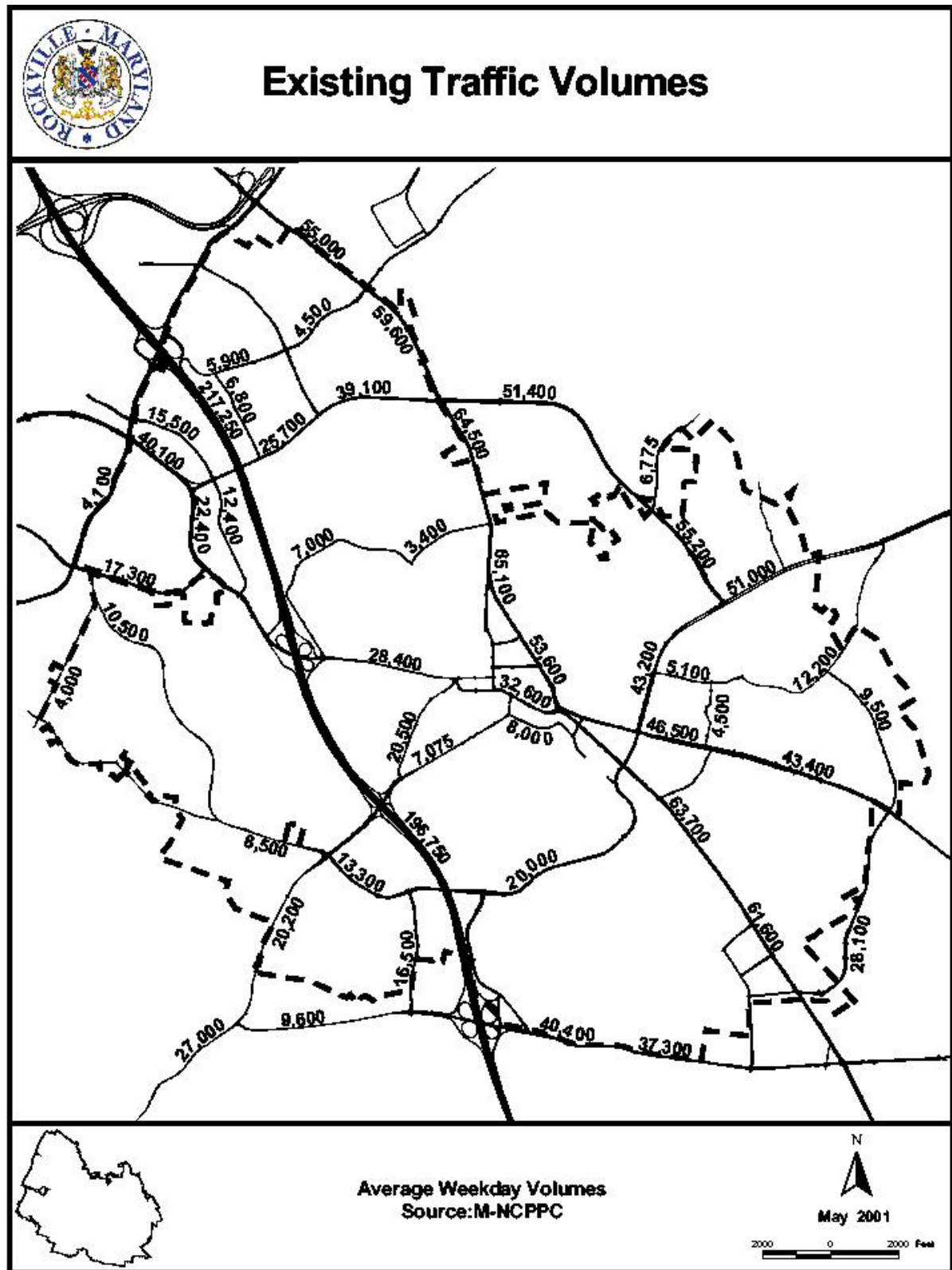
The map also depicts levels of service (LOS) at intersections. Levels of service range from A to F and represent the ratio of actual traffic volumes to the designed capacity of a roadway or intersection. For signalized intersections, LOS A describes an intersection where most vehicles do not stop at all because they arrive during the green phase. At LOS C the number of vehicles stopping is significant, though some still pass through the intersection without stopping. At LOS D most vehicles are forced to stop and congestion becomes noticeable. At LOS E delays become longer, and at LOS F the delay is considered to be unacceptable to most drivers. As the map shows, several of the major intersections in Rockville are operating at level of service F.

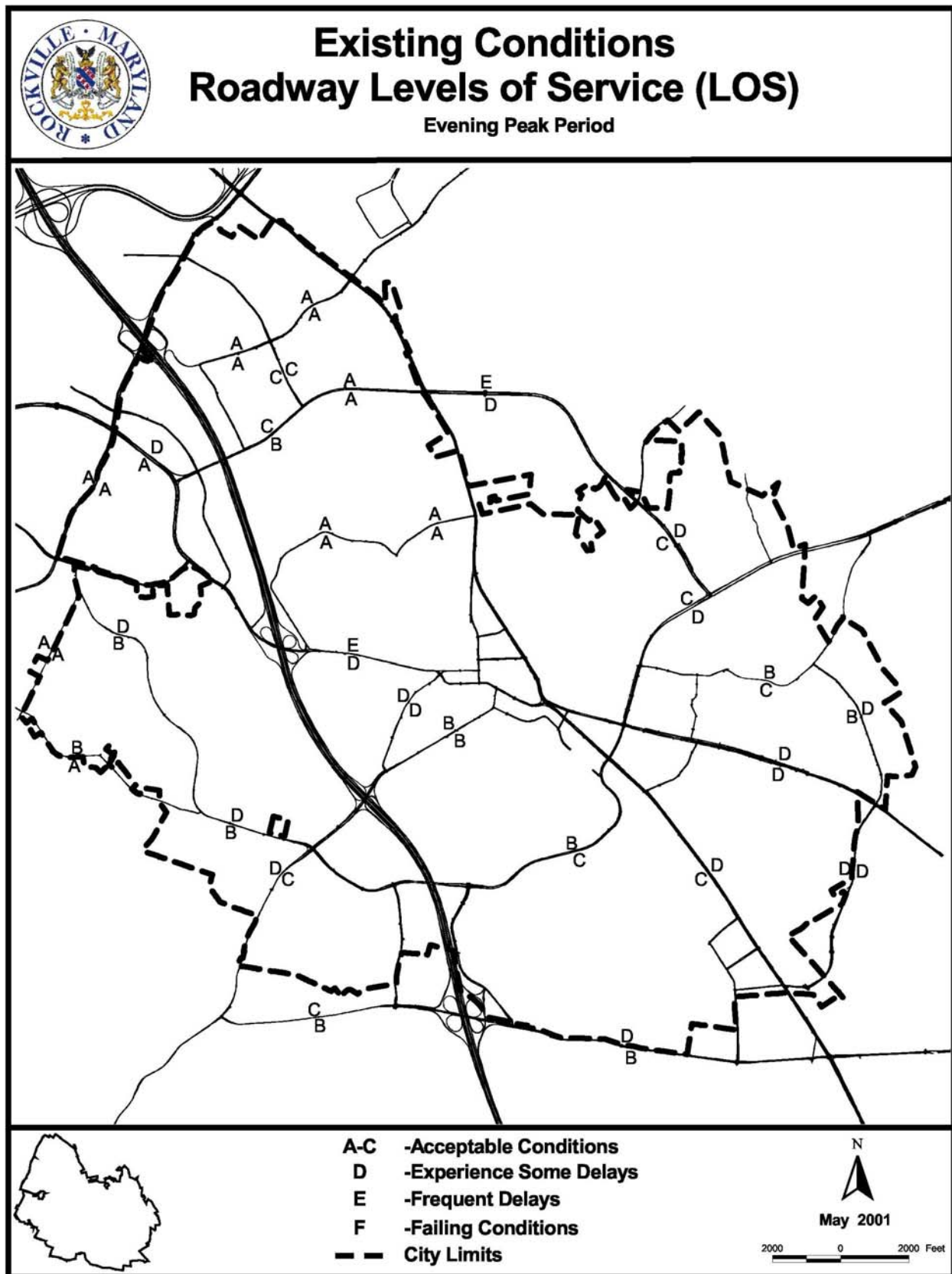
Table

Rockville Classification (Standard Term)	Description	Typical Volumes
Limited Access (Freeway)	Carries through traffic. Lanes are divided by a median. Access points are very limited.	50,000 to 250,000 vehicles per day
Major (Major Arterial)	Carries through traffic. Lanes are divided by a median. Access points are generally limited.	Greater than 25,000 vehicles per day
Arterial (Minor Arterial)	Carries through traffic. Design is more limited than on major streets. Access is less limited.	10,000 to 30,000 vehicles per day
Primary Residential – Class I (Major Collector) and Class II (Minor Collector)	Distributes traffic between neighborhoods and arterial streets. Typically has two traffic lanes.	Class I – In excess of 5,000 vehicles per day Class II – Less than 5,000 vehicles per day
Secondary Residential (Access)	Provides local access to residential properties. All non-primary streets are classified as secondary.	Up to 2,000 vehicles per day
Business District (Major/Minor Collector)	Serves adjacent business land use. Typically has four undivided traffic lanes.	5,000 to 20,000 vehicles per day
Primary Industrial (Major Collector)	Serves adjacent industrial and office land uses. Typically has four undivided traffic lanes.	5,000 to 20,000 vehicles per day
Secondary Industrial (Minor Collector)	Serves adjacent industrial and office land uses. Typically has two undivided traffic lanes.	Up to 2,000 vehicles per day

Intersection	Volume to Capacity Ratio
Shady Grove Rd / Hungerford Dr	110%
Veirs Mill Rd / First St	109%
Frederick Rd / Redland Blvd / Redland Rd	100%
Gude Dr / Hungerford Dr	98%
Shady Grove Rd / Ramp to/from northbound I-270	98%
W Montgomery Ave / Nelson St / I-270 ramps	97%
Hungerford Dr / Park Rd / Middle Ln	96%
Rockville Pike / Halpine Rd	95%
Rockville Pike / Edmonston Dr	95%
W Montgomery Ave / Laird St	94%









Description of Alternative Transportation Modes

Historically, transportation planning focused on the road network and the private automobile. Other modes are often termed “alternative transportation modes.” The role of these alternative modes will continue to increase as the City’s ability to provide more roadway capacity diminishes.

Most alternative modes of transportation are dependent on compatible forms of land use. For example, if houses are built on large lots set far back from the street or if the street patterns prohibit direct circulation, bus service becomes inefficient because so few people are within walking distance of each stop. Compact land uses are also required if the bicycle and pedestrian modes are to be used for transportation (as opposed to recreation.) Typical distances are approximately ¼ to one mile for pedestrian trips and ¼ to three miles for bicycle trips. Some of Rockville’s planning areas have been developed in a manner that is incompatible with some of these alternative modes.

The City of Rockville recently received a grant from the State to analyze automobile, transit, pedestrian and bicycle facilities in Town Center. This evaluation will significantly improve the City’s ability to analyze the current status and competitiveness of each mode. Once the methods have been developed, the analysis can be expanded to include the entire city. Supplemental reports will be issued as the results of this new technology are available.

Rail Service: Metrorail and Maryland Rail Commuter Service (MARC)

The Rockville and Twinbrook Metrorail stations are located within the city limits. Two additional stations, Shady Grove and White Flint are located just outside the City and serve many Rockville residents and businesses. All four of these stations are on the Metrorail Red Line and operated by the Washington Metropolitan Area Transit Authority (WMATA). This line runs from Shady Grove to Glenmont via Bethesda, Washington DC, and Silver Spring. Metrorail system riders have access to most areas in downtown Washington as well as many suburban centers. The stations also serve as transit hubs with local and regional bus feeder lines complementing the rail service.

Metrorail service is frequent during the typical weekday commute periods with trains arriving at stations every 3-6 minutes from 5:30-9:30 a.m. and 3-7 p.m. During the mid-day and evening periods, trains run at 12-15 minute intervals. Weekday service ends around midnight with the last train leaving Shady Grove at 11:30 p.m. and the last train arriving there at 12:40 a.m. Weekend service begins at 8 a.m. Trains run every 6-12 minutes during the day and every 15 minutes after 6 p.m. On Friday and Saturday nights the Metro operates until 2 a.m.

The Rockville Metro station served an average of 2,300 passengers during the morning peak hours (5:30-9:30 a.m.) in the fall of 2000. The station accommodates motorists by providing 532 parking spaces. Average morning peak boardings at the Twinbrook Metro station were about 2,200 in the fall of 2000. A total of 1,098 parking spaces are available at this station. Park and ride passengers make up the largest portion of the 7,900 morning peak boardings at the Shady Grove station. The station has 4,261 parking spaces. The White Flint Metro station, which contains 991 parking spaces, served an average of 1,900 passengers during the morning peak.

The Maryland Mass Transit Administration (WMATA) operates MARC commuter rail service, a 187-mile, 40-station system servicing Baltimore, seven Maryland counties, Washington D.C., and parts of northeastern West Virginia. The MARC Brunswick Line provides long distance connections between Martinsburg, West Virginia and Union Station in downtown Washington D.C. Stations along this route include Brunswick, Germantown, Gaithersburg, Rockville, and Silver Spring. The Rockville stop is at the Rockville Metro station, which is also served by Amtrak with trains to Pittsburgh and Chicago.

The Brunswick Line provides eastbound service (Martinsburg, WV to Washington DC) on weekday mornings between 5 and 9 a.m. and westbound service on weekday afternoons between 2 and 8:30 p.m. Trains run at least every 30 minutes during peak periods. No weekend service is offered.

Around 800 passenger trips are made daily using the Rockville MARC station. About 75 percent of these trips are made by passengers traveling to and from the north. These commuters get off at the Rockville station for jobs in downtown Rockville or they transfer to the Metrorail system to get to jobs in Bethesda/NIH. The other 25 percent of passengers board the MARC train in Rockville to get to jobs in downtown Washington or Silver Spring.

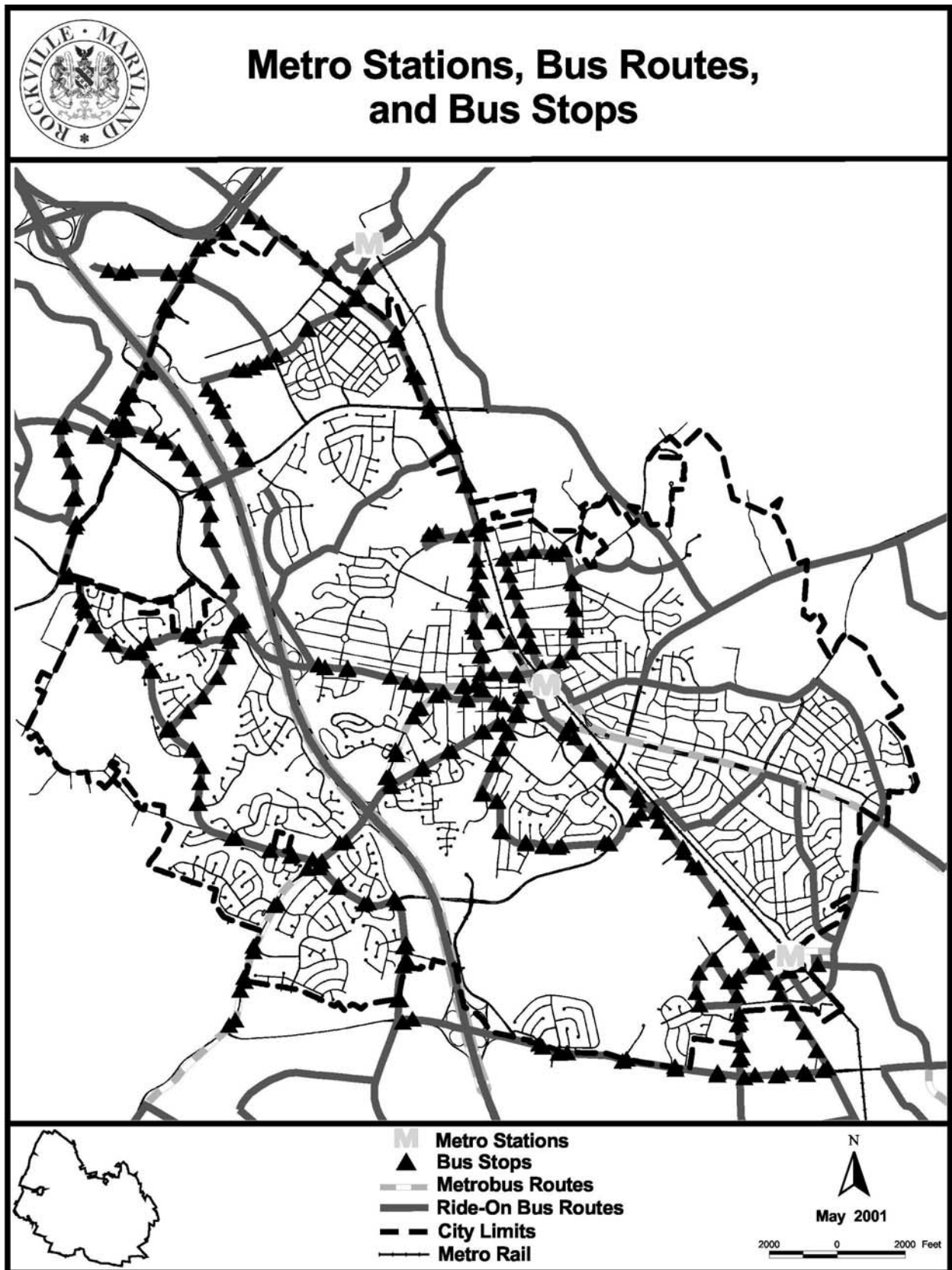
Bus Service: Metrobus and Ride-On

Rockville is served by WMATA's regional Metrobus system. This system links Rockville to other areas of the county, including Bethesda, Wheaton, and Silver Spring. The five Metrobus routes that provide service to Rockville operate along major roadways including Rockville Pike, Hungerford Drive, Norbeck Road, Falls Road, and Viers Mill Road. All of these routes serve at least one Metrorail station. Three serve the Rockville station, two serve the Twinbrook station, and one serves the Shady Grove station. Two bus routes pass through Town Center and one serves the Rockville campus of Montgomery College.

For the most part, these buses operate from 5:30 a.m. to 11 p.m. on weekdays, with service every 30 minutes. Weekend hours are more limited. The route that serves Shady Grove, Montgomery College, and the Rockville Metro station provides daytime weekday service at 10-15 minute intervals. Two routes operate only on weekdays during peak hours.

Nineteen Montgomery County Ride-On routes operate within or pass through Rockville. Twelve of these routes serve the Rockville Metrorail station, six serve the Shady Grove station, and five serve the Twinbrook Metrorail station. Eight routes pass through Town Center and three serve Montgomery College. Only one of these bus routes operates almost completely within the city.

Ten of the Ride-On routes provide service seven days a week between 5:30 a.m. and 9 p.m. For five of these routes, service extends until 12 or 1 a.m. The rest of the Ride-On routes are geared mainly toward commuters with service on only weekdays operating between 6 a.m. and 7 p.m. Five of these routes operate only during peak commute hours. For most routes, the frequency of service is every 30 minutes though some provide service every 15 minutes during peak periods.



Paratransit

Paratransit refers to a family of transportation services that are tailored to individual travel needs through flexible scheduling or routing of vehicles. Because it is generally provided in small vehicles, paratransit can be structured to be available on demand, providing door-to-door service to those for whom regular transit services are unusable. Providing paratransit options to interface with existing public transportation services increases transportation alternatives for the disabled and the elderly population.

The City runs a shuttle bus service for senior citizens, with scheduled stops at senior housing sites like the Bethany House and Heritage House. Several times each morning the shuttle runs to the Senior Center on Carnation Drive, with return trips leaving in mid-afternoon. Private homes and other stops are served by request. The shuttle also visits shopping centers and business areas on certain days each week.

Rockville participates in Montgomery County's "Call and Ride" transportation subsidy system for the elderly and the handicapped. Through this system individuals can use taxicabs at reduced fares. This allows those who may not be able to drive or use regularly scheduled public transportation to make trips to doctor's appointments, shopping centers, and other necessary destinations.

Bikeways

A bikeway is any road or path that is designated for bicycle travel regardless of whether the facility is designated for the exclusive use of bicycles or whether it is to be shared with other modes of transportation. Bikeways can be classified into three types: multi-use paths, bike lanes, and shared roadways. Multi-use paths are physically separated from motor vehicle traffic by a grass buffer or barrier. Bike lanes are portions of the roadway designated for use by bicyclists. On shared roadways bicyclist and motor vehicles share the same travel lane. National standards for bikeway terminology have changed since the 1998 Plan was adopted and are reflected in this plan.

As of July 1, 2000 Rockville had 9.2 miles of shared use paths, 2.4 miles of bike lanes, and 8.7 miles of signed shared roadways. The characteristics of the users of these different types of facilities vary widely. For example, many people are reluctant to ride bicycles in a share-the-road situation due to the proximity of traffic. Yet many bicycle commuters actually prefer on-road facilities. Most basic riders are comfortable biking on neighborhood streets and multi-use paths, but they prefer designated bike lanes on busier streets. Children require special protection because of their limited physical and judgmental abilities.



The existing bicycle network contains several major facilities, such as the multi-use paths along Wootton Parkway, Gude Drive, and Baltimore Road. The lack of safe and

convenient connections between these facilities and destinations, such as Town Center and the lower Rockville Pike corridor, causes many people to disregard bicycling as a viable means of transportation. The lack of east-west access and crossings of major roads like I-270 and Rockville Pike further constrain the current network. In 1998, the City of Rockville released an updated version of the Bikeway Master Plan to address these and other issues. The accompanying map shows the Bike Plan routes and facilities.

Bicycle racks and lockers can be found at several locations throughout the City. Currently, the Rockville Metro station contains 20 bike lockers and 30 bike racks, Twinbrook contains ten bike lockers and 22 bike racks, and Shady Grove has 16 bike racks. WMATA will soon be adding both lockers and racks to all three of these stations. The City has installed bike lockers at the Lincoln Park Community Recreation Center, Twinbrook Community Recreation Center, the Rockville Municipal Swim Center, City Hall, and the Park Maintenance facility. New private developments also are providing bike racks and bike lockers.

Pedestrian

As of December 30, 1999, the City maintained 217 miles of sidewalk adjoining 154 miles of public streets, including State highways. The following map highlights all roads that have sidewalks on at least one side.

Pedestrian facilities have been integrated in Town Center and the Rockville Pike Corridor. However, several streets in Rockville's older neighborhoods remain without sidewalks. Construction in these areas continues to be restrained by problems such as a poorly defined roadway edge (lack of curb and gutter), adverse grading, lack of right-of-way, and private landscaping. In addition to sidewalks adjoining public streets, the City maintains pedestrian pathways that connect neighborhoods, parks, schools, and other public facilities.



As of spring 2001 there were five pedestrian grade separations over or under public facilities. They are:

- Frederick Avenue – over WMATA/CSX tracks between Route 355 and North Stonestreet Avenue
- New Street – over WMATA/CSX tracks between South Stonestreet Avenue and Veirs Mill Road (near St. Mary's Church)
- Rockville Metro Station/Rockville Metro Center– over MD 355
- Lakewood School/Glenmore Terrace – over Wootton Parkway
- New Mark Commons – under Maryland Avenue west of New Mark Esplanade



PROJECTED 2020 CONDITIONS

Over the next twenty years, traffic conditions on the arterial streets in Rockville will worsen due primarily to the growth in regional travel. The significant peak period problems are forecasted to occur. The Capital Beltway, I-270, the metrorail system, and other regional facilities will experience demand well above their design capacity. Because of the lack of capacity for regional demand on regional facilities, the City's major arterials will absorb more traffic. Unfortunately, most sections of these roads are already at or above the design capacity and experience congestion. The overflow of regional demand, coupled with growth within the City, will result in highly congested arterial streets by the year 2020.

Rockville Pike (MD 355) will be the greatest challenge because it serves concentrated residential and commercial development as well as regional through traffic. Rockville Pike currently experiences failing traffic congestion from Gaithersburg to the Maryland State Line, south of Bethesda. With I-270 projected to experience demand exceeding capacity, and the Metrorail Red Line also forecasted to be overcrowded, Rockville Pike will only get worse. Over the next twenty years, most of the major intersections on MD 355 will be studied for potential traffic capacity improvements. However, in most cases, the improvements will inhibit the accessibility of pedestrians and bicyclists in the corridor. Therefore, close attention must be paid to evaluating the proposed improvements to ensure that all modes of transportation benefit from these improvements.

North-south travel patterns will be best addressed with the extension of the Metrorail Red Line in the form of the Corridor Cities Transitway. This major transit improvement, whether it is constructed as a light rail line or bus rapid transit (BRT) facility, will provide a viable alternative to the automobile for residents north of the City traveling to activity centers within the City or to the south. With the clustering of activity centers around the transit stations planned in the King Farm, light rail technology would function within the City better than a bus rapid transit facility. An additional MARC commuter train station at either the Twinbrook Metrorail Station or next to Montrose Crossing Shopping Center near Randolph Road would also provide transit commuters better access to the activity centers in the City.

Regional traffic issues will continue to be a major concern for the City of Rockville. Facilities such as additional transit service along the Beltway, the Corridor Cities Transit Easement, MARC Rail service expansion, a Potomac River crossing, and major improvements in east-west capacity such as the proposed Western Parkway should continue to be evaluated to serve existing and planned development. Environmental and social impacts should be evaluated in all studies and construction projects.

The improvements included in the plan to assist with east-west travel address the major conflict points between east-west and north-south traffic. These improvements include MD 355 and Gude Drive, MD 28 / MD 586 / MD 911, MD 355 and Middle Lane, and MD 355 and Montrose Road. To improve local circulation between East Rockville and the Town Center, the plan shows additional potential railroad crossings connecting Baltimore Road and Church Street, and Beall Avenue and North Stonestreet Avenue. Although these improvements are essential from a traffic operations perspective, the impacts on communities and pedestrian / bicycle movements would be studied prior to implementing any of the above referenced improvements.



Also, Montrose Parkway is shown to improve east-west travel at the southern boundary of the City.

While traffic conditions will worsen, bike, pedestrian, and transit accessibility should increase. With increased support from the federal and state governments in the form of transportation grants, and the City's elected officials initiating smart growth principles, pedestrian and bicycle accessibility should continue to increase. The Bicycle Master Plan outlines an extensive plan to add multi-use paths, bicycle lanes, and bicycle routes to the city infrastructure. The completion of the Millennium Trail, Baltimore Road bike path, Woodmont Greenway and Rock Creek Park connectors will significantly enhance pedestrian and bicycle accessibility for commuting and recreational use.

Rail transit travel times will become more competitive with the automobile since the facilities are not affected by traffic congestion. While bus travel times will slow due to congestion, improvements to bus stops and pedestrian facilities will encourage more bus ridership. Finally, urban design features incorporated into the Town Center, Falls Grove, and King Farm will eliminate many obstacles in accessing transit facilities.

The City received a Transportation Community Services Program (TCSP) grant from the Federal Highway Administration to assess accessibility to the Town Center. The planning effort will evaluate the accessibility of the Town Center from all portions of Rockville, for existing conditions, the next five years, and through the Master Plan buildout of the area. The analysis will identify strengths and weaknesses in pedestrian, bicycle, transit, automobile, and truck access to the Town Center. Upon completion of the baseline analysis, the project will prioritize implementation of improvements using a Geographic Information Systems (GIS) model and a series of public participation and coordination activities. The findings will be fed into the master planning process.

CRITICAL ISSUES

Currently, mobility throughout the City is limited due to traffic congestion generated by local and regional trips. Over the next twenty years, the regional population and employment is projected to grow by 39-40%. Even if Rockville stopped all future growth within its city limits, traffic congestion on City streets will increase. Regional growth, combined with anticipated development within the City will stress the existing and proposed infrastructure.

This growth will increase the desire of drivers to use residential collector streets to bypass congested facilities. Areas in the City that lack direct, logical arterial routes will suffer the most. An ongoing monitoring effort should take place to protect neighborhoods from the impacts of cut-through traffic while balancing the need for transportation capacity, connectivity, and accessibility.

To prepare for these travel demand impacts, the City must be proactive in continuing to create an environment that does not rely on the automobile for travel. To address this critical issue, the City needs to ensure that the land use patterns, urban design, and transportation system provide its residents with an environment in which goods and services are accessible.

Because of the worsening traffic congestion levels, residents will need to be able to find goods and services closer to where they live and work. Land use patterns should reflect

activity centers to provide such products. Certain land use development is critical to provide residents opportunities to travel shorter distances to find goods and services.

The urban design of city streets must continue to be retrofitted to provide better mobility for pedestrians and bicyclists. Sidewalks and bicycle facilities must be safe, connect to activity centers, and be accessible to residents. The transportation system as a whole will need to be improved so that all modes of transportation are accessible and competitive with the automobile with respect to travel time, convenience and cost.

SYSTEM EVALUATION

Based on the existing conditions and future projections, it is apparent that Rockville will face many transportation challenges over the next 20 years. The following section articulates the City's goals in meeting these challenges. Under each goal are several recommendations that offer strategies for implementation. The same structure can also be used to evaluate the City's progress in achieving these goals. The recommendations serve as the criteria for the transportation system's success.

Policy 1

Enhance the mobility of people, goods, and services.

Mobility can be thought of as how well things move within the transportation network. One way to measure mobility is by assessing how long it takes to get from point A to point B using a given mode of transportation. Thus, average travel times, flow rates, and levels of service can be used to assess the mobility of a system.

Recommendation 1: Reduce travel time to activity centers.

The term "activity center" refers to a concentrated area of development that serves as a focal point for activity in a community. Activity centers include central business districts, schools, government centers, entertainment districts and office developments. Due to the large numbers of people that these areas draw, activity centers are usually significant traffic generators with localized congestion. Examples of activity centers in Rockville include Town Center, the Metrorail stations, Montgomery College, community centers, schools, and shopping centers.

Reducing the travel time to activity centers could be accomplished by making the road network more grid-like, which provides drivers with more route options so they don't have to follow circuitous routes to their destinations and can avoid congested areas. Improving mobility may also involve improving traffic circulation in and around activity centers, increasing transit frequency, or creating bike and pedestrian links between disconnected areas.

Intelligent Transportation System technology can be used to improve mobility and safety through operations and management rather than physical improvements. With Intelligent Transportation Systems, policies and operational actions are integrated, and the system is continuously monitored and adjusted to function most efficiently. Signal coordination, incident management, signal prioritization, and reversible lanes are cost-effective ways to enhance mobility using the existing infrastructure. Obtaining and sharing current information on travel

conditions also helps manage the system, because it allows travelers to make informed decisions on how, when, and where they travel. This information can be distributed via phone, radio, televisions, kiosks, or the Internet.

Recommendation 2: Minimize congestion where appropriate.

Congestion can be defined as the delay imposed on travelers, usually due to traffic volumes that are above the levels for which the system was designed. Many times congestion is a result of constraints at a few key points in the transportation network, such as intersections, interchanges, narrow roadways, accidents, or construction activity. Levels of service (LOS) are used as a proxy for congestion levels.

For intersections, the level of service is a function of the vehicle demand, the number of lanes, the control delay, and the intersection geometry, among other factors. Adding turn lanes, altering signal timing, and limiting turn movements and driveway access can help to improve the intersection level of service. For roadways, the level of service depends on the density of vehicles, vehicle speeds, the number of lanes, the width of lanes, and the spacing between driveways, intersections, and interchanges. Levels of service on roadway links can be improved by widening the roadway, adding lanes, and limiting the number of driveways.

In Rockville much of the congestion is due to regional traffic and is beyond the City's direct control. Yet, the City can still make improvements to ease flows at key backup points. However, it is important to balance congestion relief with other transportation goals. For example, widening an intersection to improve traffic flows may compromise pedestrian or bicyclist safety because they have to cross longer distances.

The limited number of east-west connections acts to produce congestion and delays on the routes that do link the major north-south corridors. Congestion is also prominent at points that cross the WMATA/CSX tracks. Identifying new connections that will have minimal impact on surrounding neighborhoods and improving the existing east-west connections will help to ease congestion at these key points.

Recommendation 3: Maximize incentives for demand management strategies.

Transportation demand management (TDM) programs are key to improving mobility when roadway and intersection improvements would have adverse impacts. They emphasize operational and regulatory mechanisms rather than capital intensive strategies to improve the efficiency of the transportation network. Transportation demand management measures are designed to get single occupancy vehicles off the road, improve traffic flow, spread out the commuting period, and educate people about alternative modes.

Reducing the demand on the road network can be accomplished by making other modes comparable to the single occupant vehicle in terms of time, convenience, and comfort levels. Programs such as carpool matching, preferential carpool parking, subsidized transit passes, unsubsidized parking, and the availability of bike lockers and showers all serve to encourage commuters to consider other forms of transportation. The City may provide some of these services directly or it may maximize the incentives that developers and employers are given to implement these programs.

Currently the North Bethesda Transportation Management District coordinates and markets TDM programs offered by the City, County, State, and the Metropolitan Washington Council of Governments. However, this district only encompasses the southern portion of Rockville. The Greater Shady Grove Transportation Management District is scheduled to be established in year 2002 and will provide similar services for residents in northern Rockville.

The creation of a citywide TDM coordinator position could help to ensure that all residents and employers are provided with information on demand management issues and programs.

Off-site, satellite TDM offices can provide route, fare and real-time information for transit users in addition to general information on programs and incentives such as the one that will be built in the Falls Grove development. The Rockville Metro/MARC Station would be a prime location for another satellite office.

Recommendation 4: Construct multi-modal transportation improvements to support the impacts resulting from land development (Adequate Public Facilities).

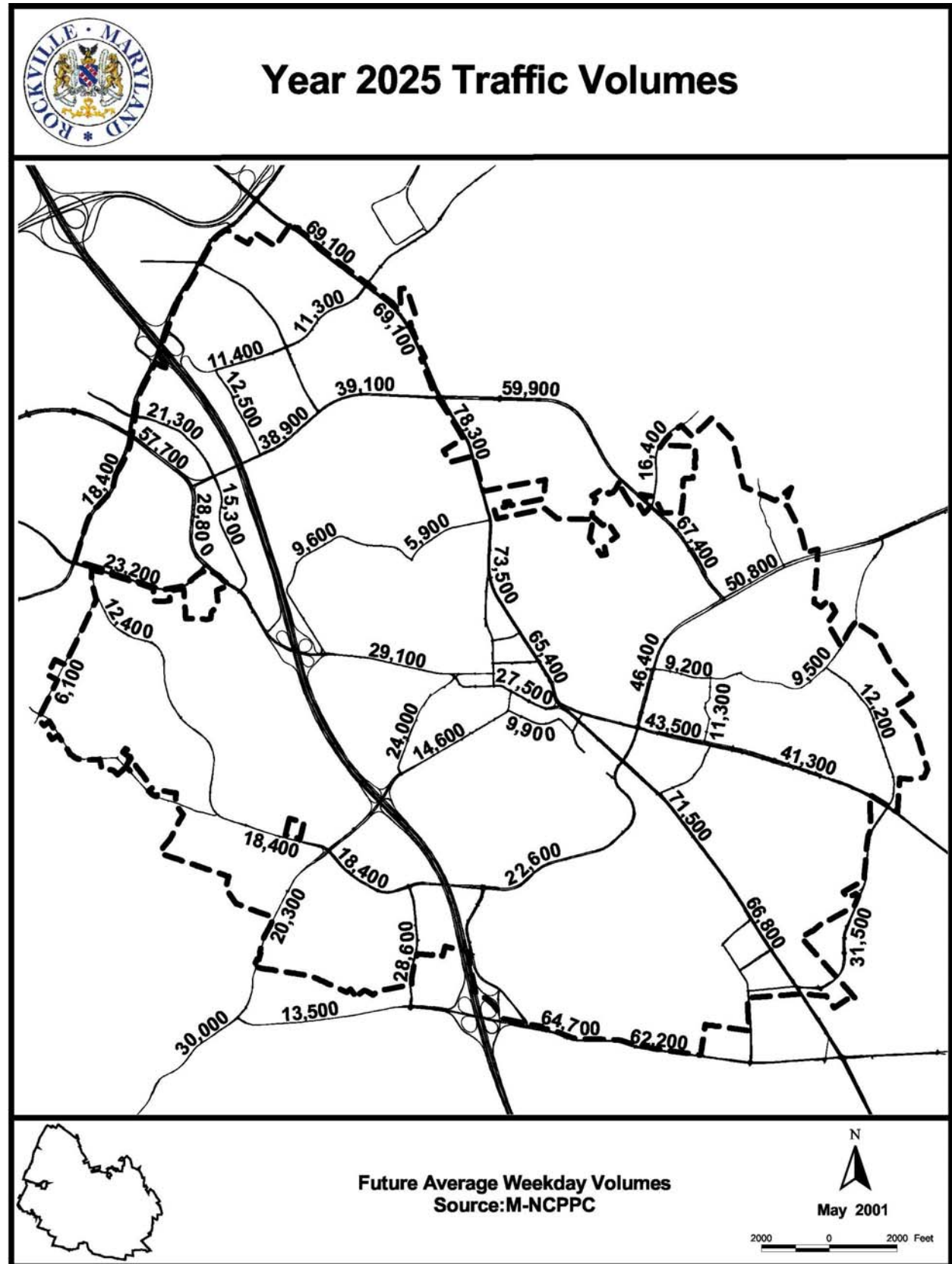
As growth continues to occur throughout the region, trips will continue to increase as individuals travel to or through Rockville. Future development constraints in Rockville may limit the city's internal traffic, but they would have no effect on increased through-traffic generated by developments outside the city boundaries. However, permitting new development in areas where level of service thresholds are being exceeded requires that measures be taken to limit deterioration in the level of service.



All applicants for Use Permits and Special Exceptions that will produce or attract more than 100 additional trips during the AM or PM peak hour are required to follow the Standard Traffic Methodology to analyze and evaluate traffic impacts. Though the Standard Traffic Methodology currently emphasized impacts to automobile traffic, it should soon be updated to include equal or similar provisions for all modes of travel, including the movement of goods.

All traffic studies submitted in support of applications for land development will consider existing traffic as well as the probable impacts of the new development. Anticipated growth in background traffic must also be considered. Programmed roadway improvements may be considered provided they are expected to be completed and open to traffic within an acceptable time frame from when the development is projected to be occupied.

If the results of the traffic study show that the new development will cause the efficiency of the road network to deteriorate, the applicant must mitigate these impacts. In the past most mitigation measures related to providing additional roadway capacity through physical improvements. Given Rockville's spatial limitations and regional context, the current development review process encourages mitigation using alternative modes. Ridesharing programs, shuttles to transit stations, and installation of pedestrian and bicycle facilities are examples of measures that can reduce demand on the road network. Aside from these mitigation actions, the applicant may also be obligated to contribute toward the improvement of transportation and safety facilities located offsite.



The spatial limitations also mean that potential mitigation measures are increasingly more substantial. Instead of adding a turn lane in the vicinity of a proposed development, a developer may be required to contribute funds toward a major facility that will have an impact beyond just the increased traffic created by the new development.

Because some of the impacts of new development will not be anticipated or will fall outside the scope of the traffic study, the City is formalizing a policy that will require that applicants for commercial development and multi-family housing projects pay a Transportation Management Fee. Monies collected from the Transportation Management Fee will be used in support of programs and physical improvements intended to mitigate these impacts. They may include outreach and education on alternative modes, bus stop improvements, installation of pedestrian signals, and other programs to promote the use of transit, pedestrian, and bicycle modes in the area of the new development.

Policy 2

Promote a transportation system that is multi-modal, accessible, and friendly to all users.

Accessibility is defined as the ability to get from point A to point B via various means of transportation. Making all modes of transportation accessible to as many people as possible is a top priority for the City. Pedestrian and bicycle links between modes are key especially where they provide direct access to transit stops. Access to public transportation is particularly crucial for certain segments of the population including the elderly, children, and those who may not have access to a personal vehicle. Ensuring that transportation facilities comply with the Americans with Disabilities Act (ADA) will improve the mobility and independence of all citizens.

Recommendation 1: Improve pedestrian connections from households to activity centers.

The suburban nature of many areas in Rockville makes people dependent on the automobile. Residential neighborhoods are separated from commercial areas. Cul-de-sacs and dead end streets divide uses that are physically proximate. Some neighborhoods have no sidewalk or walkway system. There is competition between the automobile and pedestrians at intersections. All of these factors force many residents to disregard walking as a viable means of transportation.

Providing safe, direct pedestrian routes between residential areas and activity centers can help reduce the number of day-to-day vehicle trips. These connections can be created or improved by installing sidewalks, adding paths to link cul-de-sacs and dead end streets, installing pedestrian signals and crosswalks, or by constructing pedestrian bridges over busy roadways. Treatments, such as lighting, landscaped buffer areas and other streetscape improvements, can heighten safety and make pedestrian facilities more attractive for users. The City of Rockville's "Synthesis of Pedestrian Policies" manual should be used to guide the construction of pedestrian facilities.

Recommendation 2: Improve bicycle connections from households to activity centers.

Major bicycle facilities are in place such as the paths on Gude Drive, Wootton Parkway and Baltimore Road. Yet, strong bicycle connections between these facilities and activity centers are lacking. Access points between bike facilities and nearby residential communities can also be strengthened. Traffic calming measures, buffers, and safer crossings may be required to increase comfort for cyclists of all skill levels. The quality of the environment during the entire trip—from origin to destination—is the largest factor in the choice to use the bicycle mode of transportation.



The City of Rockville's Bikeway Master Plan should be used to incorporate bikeway facilities into capital improvements, private development, and redevelopment projects where possible. By integrating bikeways into other projects and developments, the proposed bikeway plan can be implemented in a more timely and efficient manner.

Recommendation 3: Increase transit use by residents and employers.

Rockville is well-served by various forms of regional mass transit. Metrorail, MARC trains, and Metro and Ride-On Buses connect Rockville to downtown Washington, its suburbs, and distant locations to the north and west. The completion of the planned Corridor Cities Transitway from Shady Grove Metro Station to Clarksburg and Germantown would link the existing Metrorail system with either light rail or bus rapid transit technology. In addition, new locations for dedicated busways (exclusive lanes for express buses) and additional MARC stations are being explored.

As Town Center redevelops and the King Farm and Fallsgrove communities are finished, there will be a greater need for local bus routes. The frequency of service may need to increase in order to compete with other modes and attract new riders. New bus routes should be created to serve high-density residential areas and employment and activity centers away from Town Center and the Metrorail stations. Both the King Farm and Fallsgrove developments were designed to accommodate local bus service. The King Farm bus system was planned so that it can eventually accommodate the Cities Transitway.

Research suggests that the average person will walk no further than 7/10 mile to get to a Metrorail station, ½ mile to get to a MARC station, and ¼ mile to get to a bus stop. These distances can be used to estimate how many households could potentially use transit (assuming their destinations are also within the given distance of a transit stop.) The Transportation Community Services Program (TCSP) grant, awarded in February 2001, will quantify the portions of Rockville accessible to transit.

The use of transit facilities is determined not only by the distance to a transit stop, but also by the pedestrian facilities around these stops. Without direct pedestrian facilities to transit stops, transit use declines dramatically. Though many are within walking distance of transit stops, Rockville's residential communities require enhancements to increase the attractiveness

of transit. These enhancements include continuous sidewalks from residences to transit stops, covered shelters, and availability of information on transit routes, fares and schedules. Existing office developments can also be retrofitted to be more compatible with transit by providing pedestrian paths and bus shelters.

The Fallsgrove Multi-Modal Center is an example of how transit facilities can be integrated into a development. This center will be constructed in the commercial area of the new Fallsgrove development where several Ride On bus routes will converge. It will contain a waiting area, benches, bicycle racks, and other features to accommodate people waiting for buses, carpools, and taxis. Staff will be available with information on transit schedules, fares, and passes. Information will be available to allow patrons to obtain real-time information on the locations and estimated arrival times of buses. Because of its design and location in the Village Center, the Multi-Modal Center will be accessible to residents and employees throughout the Fallsgrove development.

Recommendation 4: Increase carpool and vanpool use.

Carpools provide an alternative to the single occupant vehicle when two or more people have proximate origins and destinations. They are one of the few transportation alternatives available to those whose origins or destinations are not within a reasonable distance of transit facilities. High-occupancy vehicle (HOV) lanes, which run along I-270 from about 10 miles north of Rockville to the Capital Beltway, make this mode of transportation appealing to many Washington Metropolitan Area residents. Another incentive is the cost and limited availability of parking in downtown locations and around rail stations. Employers can encourage their employees to use carpools by providing ridesharing programs, reserved preferential parking for carpools, guaranteed ride home programs, and compensation for employees who do not use their parking passes.

Vanpools are most often provided by a large employer or multi-family housing management. Some operate as shuttles to and from transit facilities, while others provide door to door service.

There are a variety of regulatory methods that could be used to promote these alternative modes. Some of them may be controversial. One method could require applicants for new office development to reserve 5 percent of the available parking spaces for carpools. Another initiative could set a graduated fee for each parking space above the minimum required by the Zoning Ordinance. It is intended to give developers an incentive to not oversupply parking.

Recommendation 5: Ensure multi-modal access to new developments.

If new developments rely strictly on the existing road networks to absorb all of the new demand they create, congestion will increase even in areas where roads are not operating at capacity. Yet, if these developments are designed with accessibility to all modes of transportation in mind, impact on the road system can be minimized. Although most of the land in the city is now developed, the potential for redevelopment in areas like Town Center, Twinbrook, and the Rockville Pike Corridor provides opportunities to implement land uses that stimulate the use of transit and encourage pedestrian activity.



Simple design measures such as locating buildings close to the street, installing bicycle racks, and constructing bus shelters can help to make the environment more welcoming to pedestrians, bicyclists, and transit riders. Pedestrian access and circulation within developments is also extremely important. Site design must emphasize the safe and efficient movement of pedestrians in addition to other modes.

Policy 3

Respect and protect neighborhoods especially from the impacts of regional traffic.

While the integrity of Rockville's neighborhoods is primarily addressed in other sections of the Master Plan, the relationship between transportation and the quality of neighborhoods cannot be overlooked. Controlling the impacts of commuters from outside the City on Rockville's streets may be the greatest challenge facing the City over the next 20 years.

Recommendation 1: Minimize non-local traffic in neighborhoods.

A primary concern of the City is ensuring that residential neighborhoods are not overwhelmed by non-local traffic using neighborhood streets to avoid traffic and delays on major roads. This spillover through-traffic has significant negative impacts on neighborhoods, especially with respect to safety.

Rockville specifies maximum daily traffic volumes for streets classified as residential. This reflects the City's policy that the needs of the neighborhood be considered along with the goal of traffic movement. Through-traffic should be kept on the arterials and major roads that were designed to handle high volumes. Though neighborhoods will never be free of traffic, the street design should ensure that the traffic within them is related in character and volume to the environmental conditions sought.

Various methods of preventing through-traffic or slowing that traffic are in place throughout the city. Turn prohibitions, half closures, and forced turn islands, are used to control traffic volumes. Speed humps and narrow streets are designed to control vehicle speeds. Some of these measures can be installed with relative ease using signs and pavement markings. Others are more permanent in nature and require substantial design work.

Neighborhood protection must be balanced with neighborhood access. It is important that access by fire, police, and other emergency vehicles be considered when choosing between methods to control through-traffic. Accessibility and mobility of neighborhood residents is another important consideration. While a partial street closure may be desirable to some residents, others may be unwilling to accept the inconvenience caused by such an option. For this reason, general consensus among neighborhood residents is required before the City will take action.

Though further study and general neighborhood consensus would be required before any physical changes were made, areas where measures to prevent through-traffic have been requested include:

- Twinbrook
- Rockshire
- West End

- Fallsmead
- Croydon Park

In some residential neighborhoods a permit parking system is in place to prevent unwanted non-resident parking. Permit parking is particularly useful in areas near Town Center, Metro stations, schools, and other traffic generators.

Recommendation 2: Minimize transportation noise impacts in neighborhoods.

Even if traffic is not spilling over onto neighborhood streets, it may still have significant noise impacts on communities. While this is not a safety issue, it can affect the quality of life for residents. Standards for traffic noise mitigation must be met as new roads are built. In the case of existing roadways, buffer areas and landscape berms can be used to screen neighborhoods from the negative impacts of noise. However, for existing roadways mitigation is neither required nor feasible in many cases. Likewise, railroads are not required to provide noise mitigation. Noise issues are of particular concern in the following corridors:

- I-270 Corridor
- MD 355 Corridor
- Gude Drive Corridor
- Viers Mill Road Corridor
- Wootton Parkway Corridor

Recommendation 3: Minimize the use of neighborhood streets by heavy trucks.

Heavy trucks cause noise, visibility problems, and unnecessary wear on the physical structure of residential streets. Signs restricting heavy trucks can be used to limit truck traffic. Stricter enforcement of laws restricting truck traffic will also help to protect residential streets. Signs are already in place in the Darnestown Road corridor near the Rockville Crushed Stone quarry. Additional signs should be installed as new needs are identified areas where heavy truck traffic is of concern and warrants further study include:

- Lincoln Park
- Portions of West End

Policy 4 Protect the environment.

Environmental quality is primarily addressed in other sections of the Master Plan. Yet transportation facilities can impact the natural, cultural, and socioeconomic environment both positively and negatively.

Recommendation 1: Minimize the impact on the natural environment.

The construction of roadways inevitably alters the natural environment because of the creation of more impervious surface. In addition, siting of facilities may require the removal of

trees and other natural features. It is important to minimize these impacts as new roads, sidewalks, bikeways, entrances, and parking areas are built and existing ones are expanded.

The Intermodal Surface Transportation Efficiency Act, National Environmental Policy Act, and Clean Air Act Amendments were designed to ensure that environmental impacts of transportation projects are analyzed and considered. All new transportation facilities will be constructed in accordance with the policies and provisions outlined in these regulations.

The Washington Metropolitan Region has been designated as a serious nonattainment area for ground-level ozone under the Clean Air Act Amendments. This type of ozone is produced through reactions from vehicle emissions. Because of the nonattainment designation, the Washington region is required to implement a plan that will reduce emissions of volatile organic carbons (VOCs) by 15% from the 1990 base year levels.

The Metropolitan Washington Council of Governments (MWCOC) is the coordinating agency for the emissions reduction plan. The MWCOC programs and recommendations to promote alternative modes and reduce transportation demand are consistent with the City's transportation goals.

Recommendation 2: Minimize the impact on the cultural environment.

Rockville contains significant cultural and historic resources. It is important that impacts on these resources be minimized as transportation facilities are constructed, improved, and maintained. In some instances transportation facilities can be used to enhance cultural resources and public spaces. For example, the use of brick sidewalks in historic districts complements the architectural features of the area and improves the appearance of the streetscape.

Recommendation 3: Minimize the impact on the socioeconomic environment.

Properties, homes, and businesses may be directly or indirectly affected by transportation improvements. Though many transportation projects have positive effects on the assessed values of the surrounding properties, such as sidewalk installations, the construction period may cause considerable disruption to residences and businesses. Care should be taken to minimize negative impacts as new facilities are sited and existing facilities are upgraded and maintained.

Policy 5

Foster a safe and maintainable transportation network that encourages the observance of traffic laws.

Safety is a fundamental part of any transportation system. The location of facilities as well as the facility design, timing of signals, and visibility of signs and markings all influence safety. To a large extent the use of transportation facilities is dependent on the comfort level of potential users and the perceived level of safety, particularly in the case of pedestrians and cyclists.

Through the efforts of City staff and the input of citizens, Rockville's transportation network is continuously monitored for safety and maintenance concerns. Because these types of issues change over time as traffic volumes, facility use, and land use characteristics change, safety and maintenance are typically addressed on an annual basis through the budget and the Capital Improvements Program (CIP).

Recommendation 1: Improve pedestrian and bicycle safety.

The safety of pedestrians and cyclists is of utmost importance to the City. Often the demand for bike and pedestrian facilities is underestimated because current volumes do not reflect the number of people who would use these facilities under safer conditions. These modes should be given special consideration in areas of high activity, particularly near schools, parks, shopping, and recreation facilities.

Design measures such as buffers between sidewalks and roads, refuges in medians at intersections, and crosswalk markings are ongoing CIP projects targeted at improving safety. In addition, the redevelopment of properties provides opportunities to improve pedestrian facilities and to add bikepaths where possible. As roadway improvements are made, bikelanes can be added where appropriate. Pedestrian-operated signals, traffic calming measures, warning signs and other features that enhance safety may be warranted in certain cases.

Vehicle speeds on roadways are directly related to bike and pedestrian safety at crossings and on adjacent facilities. If roadways can be designed in a manner that encourages drivers to travel at the desired speed, the potential for accidents can be reduced. Design is usually more effective than enforcement in controlling vehicle speeds. Speed limit signs have only a marginal effect in cases where a road has been overdesigned.

The design of pedestrian and bicycle facilities is also important in terms of personal safety. Isolated and poorly lit areas may trigger feelings of uneasiness causing some would-be pedestrians and cyclists to choose other modes.

Recommendation 2: Improve the lighting on City streets.

Lighting is an important safety element, especially for pedestrians and transit users. As new projects go through the development review process, lighting plans are comprehensively reviewed for effectiveness of illumination, energy efficiency, and reducing light pollution. Lighting in some existing areas may be inadequate in terms of illumination or energy efficiency. Illumination is particularly important in areas around Metro stations, bus stops, activity centers, and the pedestrian corridors that lead to these areas. Light levels can be increased by installing more fixtures, improving the existing infrastructure, or by upgrading the types of bulbs used.

However, in residential neighborhoods it is important to balance safety concerns with the wishes of residents who may not want to see glare or light spillover from overhead light fixtures onto their homes. In other areas, decorative lighting fixtures may be desired to create a distinctive ambiance but may not be either the brightest or most energy efficient light source. Another factor to be considered is that ambient light spillover from all types of light fixtures (including signs) is beginning to be an issue in urban areas. Installing light fixtures that are considered "dark sky friendly" may be beneficial.

Recommendation 3: Improve vehicular safety on City streets.

Through advances in road design and vehicle features the number of traffic fatalities has decreased significantly over the last 20 years. Yet accidents still occur. While driver behavior is often unpredictable, vehicular safety can be improved through the design of transportation facilities. Since the overdesign of roadways often tempts drivers to travel at speeds higher than what is desired for an area, the character of the road and of adjacent land uses must be considered as new roads are proposed. Safety treatments on existing facilities include improving visibility, creating deceleration lanes, restricting turn movements, and limiting the number of driveways. These measures must be balanced with mobility, efficiency, and environmental and aesthetic concerns. For example, improving visibility from a driveway or intersection may involve trimming or removing trees and landscaping.

Recommendation 4: Maintain quality traffic controls at City intersections.

Signs and signals at intersections must be continuously monitored to ensure that they efficiently control traffic flows. The City uses computers, modeling software, traffic counts, and extensive neighborhood studies to do this. Often signs and the timing of signals must be altered to keep pace with changing conditions. The City is open to citizen requests, though traffic studies must show that the proposed changes are warranted. Traffic signals will only be installed at locations that meet engineering criteria as outlined in the Manual on Uniform Traffic Control Devices.

Recommendation 5: Maintain streets in superior condition.

Potholes, debris, and damaged markings present considerable safety hazards for drivers, pedestrians, and cyclists as well as reflecting poorly on the City. Maintaining streets, sidewalks, lighting, signs, signals and markings assures that the transportation network will continue to function as designed.

Policy 6

Minimize the neighborhood separation effects of major transportation facilities.



The Metrorail lines and major highways like I-270, MD 28, and Veirs Mill Road form boundaries between neighborhoods. While the effects of this division and some potential solutions are discussed in other sections of the Master Plan, providing transportation links between these areas is the first step toward forming social and economic connections.

Recommendation 1: Retrofit pedestrian and bike connections between existing neighborhoods that are divided by major transportation facilities.

By design, major transportation facilities restrict vehicle access, which forces local drivers to take circuitous routes to their destinations. This increases travel times and congestion on the main links between two areas. Providing pedestrian and bike connections between neighborhoods that are divided allows citizens to access proximate land uses without having to use their cars. Facilities like I-270 and the Metrorail tracks require grade-separated (overpasses and underpasses) pedestrian connections. In other cases existing intersections can be upgraded to accommodate non-vehicular movements.

Several facilities in Rockville have been identified as locations where pedestrian and bike connections should be installed or improved. These include:

- I-270 at Shady Grove Road
- I-270 at MD 28
- I-270 at Falls Road
- MD 355 between King Farm and the Shady Grove Metro station
- Metrorail tracks at Twinbrook Metro station

Recommendation 2: Retrofit the existing street network to “bridge” the gap between the communities.

Rockville’s road network is also affected by major transportation facilities. Several streets were divided when the Metrorail lines were installed. For some neighborhoods this was beneficial because the amount of through-traffic was significantly reduced. In other areas, the benefits of improved automobile and bus circulation that would result from bridges or underpasses across the Metrorail tracks may outweigh the associated costs.

Aside from those roads that are affected by major transportation facilities, many other streets terminate in dead ends or cul-de-sacs. In some cases these streets can be extended so they connect to other streets without compromising the character of the area. Mobility and accessibility are increased because drivers are given more route options. Extensions may be required to handle traffic circulation from new or re-development or they may be used to connect neighborhoods and activity centers that are currently divided.

Connections can also be made strictly for bike and pedestrian movements. Sidewalks and paths that connect dead ends and cul-de-sacs to the main road network can reduce travel times to schools, parks, transit stops, and other activity centers. One current example of this is the sidewalk and staircase that connect Rockcrest Circle to the sidewalk along First Street. This link is used by students in the Rockcrest neighborhood who attend Richard Montgomery High School.

PROPOSED TRANSPORTATION IMPROVEMENTS

New Roads

1. Fallsgrove road network
2. King Farm road network
3. Montrose Parkway – with bike path and no truck restrictions

Street Extensions

4. Chapman Avenue – extended north to 355
5. Chapman Avenue – extended south to Randolph Road
6. Choke Cherry – extended to south to Piccard Drive
7. Dawson Avenue – extended east to Hungerford Drive (MD 355)
8. Fleet Street – extended to connect existing segments
9. Maryland Avenue – extended north to Dawson Avenue extension
10. Nebel Street – extended north to Bou Avenue (in County just south of Rockville)
11. Pleasant Road – extended to connect existing segments

Interchanges

12. I-270 at Gude Drive – HOV lanes only

Transit

13. Corridor Cities Transitway through King Farm
14. MARC station at Twinbrook Metro or at Randolph Road/Nebel Street

Grade Separations

15. East Jefferson Street (MD 28) and Rockville Pike (MD 355)
16. First Street (MD 911) and Rockville Pike (MD 355)
17. Gude Drive and Hungerford Drive (MD 355)
18. King Farm Boulevard and MD 355 – bike and pedestrian crossing to Shady Grove Metro
19. Middle Lane and Hungerford Drive (MD 355)
20. Montrose and Rockville Pike (MD 355), with a crossing of the Metro tracks at Randolph Road (outside of City)
21. Veirs Mill and (MD 586) and First Street (MD 28)

New Connections

22. Beall Avenue and Metro/CSX tracks – extend Beall Avenue to North Stonestreet Avenue
23. Church Street and Metro/CSX tracks – extend Church Street to Baltimore Road

Other

24. King Farm – improve Shady Grove ramp/Redland/King Farm Boulevard (study circulation)
25. Stonestreet Avenue – realign near intersection with Park Road

